

# YOUNGSU KIM

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## Academic Positions

- Associate Professor, California State University San Bernardino, Aug 2025 – present.
- Assistant Professor, California State University San Bernardino, Aug 2020 – Jul 2025.
- Visiting Assistant Professor, University of Arkansas, Fayetteville, Aug 2017 – Jul 2020.
- Visiting Assistant Professor, University of California, Riverside, Sep 2014 – Jun 2017.

## Education

- Ph.D. in Mathematics, Purdue University, Aug 2014, advisor: Professor Bernd Ulrich.
- B.S. in Mathematics, Summa Cum Laude, Korea Advanced Institute of Science and Technology (KAIST), Feb 2006.

## Research Interests

- Commutative Algebra and Algebraic Geometry; MSC 13, 14: Blow-ups and its Related Topics, Linkage, Closure Operations, Multiplicities, Log Canonical Threshold, and Macaulay2 Programming.

## Teaching Awards

- Outstanding Visiting Assistant Professor, Department of Mathematics, University of California, Riverside, 2016-17.
- Excellence in Teaching Award, Department of Mathematics, Purdue University, 2012-13.
- Committee for the Education of Teaching Assistants (CETA) Teaching Award, Purdue University, 2012-13

## Awards/Grants/Fellowships

- 2024 Vital and Expanded Technologies Initiative (VETI) Grant: at California State University San Bernardino (\$10,071.00).
- 2018-2019 University of Arkansas Deans' Office Travel Grant.
- AMS Graduate Student Travel Grants, Fall 2013, Spring 2014.
- Member (Program Associate), MSRI, Spring 2013.
- MSRI Workshop Travel Grants, Fall 2012, Spring 2013.
- Purdue Research Foundation Fellowship, Spring 2010.
- Purdue Research Foundation Summer Fellowships, Summer 2008, 2009.

## Professional Memberships

- Member, American Mathematical Society, 2006–Present.
- Member, Mathematical Association of America, 2021–Present.

## Professional Activities & Services

- Co-coordinator of the CSU-LSAMP Program at California State University San Bernardino, 2024–Present.
- Local host of a Mathematical Association of American SoCal/Nevada F2022 sectional meeting at California State University San Bernardino (in-person).
- Faculty Fellow of High-Performance Computing Initiative, academic years 2021–2024, California State University San Bernardino.<sup>1</sup>
- Scientific committee for the first CSU Mathematical Conference, F2022.
- Students Grade Appeal Panel, Fall 2021 – Spring 2023, California State University San Bernardino.
- Student Aid Panel, Spring 2022 – Spring 2023, California State University San Bernardino.
- Department of Mathematics Student Scholarship Committee, Spring 2021–, California State University San Bernardino.
- Department of Mathematics co-webmaster, Fall 2021–, California State University San Bernardino.
- Meetings Coordinator, Mathematical Association of America SoCal-Nevada Section, Sep 2021 – Feb 2024.
- Co-organizer of a special session at the AMS Meeting in Georgia Tech., Atlanta, Mar 2021.
- Teaching assistant for the undergraduate workshop for the Thematic Program in Commutative Algebra and its Interaction with Algebraic Geometry at the University of Notre Dame, May 2019.
- Co-organizer of a special session at the AMS Meeting in Loyola University, Chicago, Oct 2015.
- Referee for Journal of Algebra, Journal of Pure and Applied Algebra, Journal of Algebra and Its Applications, Journal of Commutative Algebra, Proceedings of the AMS, and Honam Math. Journal, PUMP Journal of Undergraduate Research.
- Reviewer for Mathscinet.
- Purdue University, Organizer of the Student Commutative Algebra Seminar, 2010–2012.
- Purdue University, Graduate Students Representative, 2010–2011.
- University of California, Riverside, Recommendation letters for undergraduate students.

## Publications

### In Journals

1. With Jaiung Jun and Matthew Pisano, On Picard groups and Jacobians of directed graphs, *Linear Algebra and its Applications* **711** (2025) 180–211.
2. With Justin Chen and Jonathan Montaña, *Computing multiplicity sequences*, *Journal of Software for Algebra and Geometry*, **14** (2024), 13–18.
3. With Lance E. Miller, Wenbo Niu, *Log canonical thresholds of generic links of determinantal varieties*, *Proc. Amer. Math. Soc.* **149** (2021), 2777–2787.
4. With Vivek Mukundan *Equation defining certain graphs*, *Michigan Mathematical Journal* **69** (2020) 675–710.
5. With Andy Walker, *A note on non-Noetherian Cohen-Macaulay rings*, *Proc. Amer. Math. Soc.* **148** (2020), 1031–1042.
6. With Louis J. Ratliff and David Rush *A Note on Itoh (e)-valuation Rings of an Ideal*, *Journal of Algebra* **498** (2018), 47–70.
7. With Justin Chen, *Graded-irreducible Modules are Irreducible*, *Communications in Algebra* **45** (2017), 1907–1913.
8. *Quasi-Gorensteinness of Extended Rees Algebras*, *Journal of Commutative Algebra* **9** (2017), 507–544.
9. With William Heinzer and Matt Toeniskoetter, *Blowing Up Finitely Supported Complete Ideals in a Regular Local Ring*, *Journal of Algebra* **498** (2016), 364–386.
10. With Aline Hosry and Javid Validashti *On the Equality of Ordinary and Symbolic Powers of Ideals*, *Journal of Commutative Algebra* **4** (2012), 281–292.

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<sup>1</sup><https://www.csusb.edu/academic-technologies-innovation/xreal-lab-and-high-performance-computing/high-performance-0>

## Macaulay2 Package<sup>2</sup>

- With Justin Chen and Jonathan Montaño, *MultiplicitySequence: A Macaulay2 Package for Computing Invariants Related to multiplicities*.

## Talks: Mathematics

- Invited talk at the Algebraic Geometry at Primary Undergraduate Institute (AG@PUI), virtual, 2024.
- Invited talk at the Combinatorial Number Theory Seminar at University of California Riverside, 2023.
- Invited talks for California State University San Bernardino Data Analytics Working Group (topics: Git, Python Pandas, Data Visualization).
- Invited speaker for the REU program, Pomona Research in Mathematics Experience, Pomona College, Summer 2023.
- Invited talk in the REU program, Pomona Research in Mathematics Experience, at Pomona College, Su2022.
- Invited talk in the Claremont Colleges Colloquium Series, Claremont Center for the Mathematical Sciences, S2022.
- Special Sessions at AMS Sectional Meetings, March 2022, Sep. 2020, Apr 2020 (canceled due to COVID-19), Nov 2018 (two talks), Oct 2018, Apr 2016 (two different meetings), Oct 2015, Mar 2015, Oct 2014, Apr 2014, Nov 2013, Oct 2013, Oct 2012.
- Invited talk for the undergraduate research seminar Math and Cookies at the State University of New York, New Paltz, F2021.
- Special Sessions at Korean Mathematical Society, Apr 2021, Oct 2020.
- Contributed Papers Sessions at Joint Mathematics Meetings, Jan 2020.
- Algebra Seminar, Department of Mathematics, Tulane University, New Orleans, Louisiana, Nov 2019.
- Algebra Seminar, Department of Mathematics, Iowa State University, Ames, Iowa, Nov 2019.
- Algebra Seminar, Department of Mathematics, New Mexico State University, Las Cruces, New Mexico, Oct 2019.
- Algebra Seminar, Department of Mathematics Education, Chonnam National University, Gwangju, Korea, Aug 2019.
- Colloquium, Department of Mathematics, University of Ulsan, Ulsan, Korea, Jun 2018, Jan 2018, Sep 2016.
- Algebraic Geometry Seminar, KIAS, Seoul, Korea, Aug 2019, Jun 2018, Dec 2017.
- Algebraic Geometry Seminar, KAIST, Daejeon, Korea, Mar 2018, Sep 2016, Jun 2010.
- Colloquium, Department of Mathematics, Chungnam National University, Daejeon, Korea, Jan 2018.
- Southwest Local Algebra Meeting, Mar 2017.
- Algebraic Geometry Session at Vietnam - Korea workshop on selected topics in Mathematics, Da Nang, Vietnam, Feb 2017.
- Commutative Algebra Seminar, Purdue University, Sep 2016, Oct 2015, Mar 2015, Nov 2013, Apr 2011.
- Colloquium, California State University, San Bernardino, San Bernardino, Feb 2015.
- Commutative Algebra Seminar, University of Utah, Sep 2014.
- Kumunu Jr. 2014, University of Nebraska-Lincoln, Apr 2014.
- Commutative Ring Theory Seminar, University of Illinois at Urbana-Champaign, Urbana-Champaign, Nov 2013, Nov 2012.
- Commutative Algebra Seminar, University of California Riverside, Riverside, Apr 2013.
- Mathematics Research Community (MRC) on Commutative Algebra in Snowbird, Utah, Jun 2010.

## High-Performance Computing

- **High-Performance Computing (HPC) Related Work**
  - NSF-Funded Cyberinfrastructure Professional Training (NSF #OAC-2230127), 2023.
  - HPC Consultant for California Polytechnic Humboldt, S2024.

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<sup>2</sup>Macaulay2 is a computer algebra software specialized in algebraic geometry and commutative algebra

- Developed tutorial on Computer Algebra Software for NSF ACCESS program
- **Professional Certifications and Training**
  - *TensorFlow Developer Certificate*, issued October 2023.
  - *Google Data Analytics Certificate*, issued October 2023.
  - *Deep Neural Networks with PyTorch*, Certificate earned December 2023.
- **Conferences/Workshops**
  - Computational and Information Modeling for Life Sciences and Informatics (CIMLSI) Workshop, SDSC, 2023
  - High-Performance Computing - Data Science - Science Integration (HPC-DS-SI) Workshop, SDSC, 2023
  - Fifth National Research Platform (5NRP) Workshop, UC San Diego, 2024
  - Corporation for Education Network Initiatives in California (CENIC) 2024 Conference

## Research Conferences and Workshops

- The Joint Mathematics Meetings, 2025, 2020, 2019, 2017, 2013, 2011.
- Conference on Commutative Algebra and its Interaction with Algebraic Geometry and Algebraic Combinatorics, the University of Notre Dame, South Bend IN, 2024.
- Mathematical Pathways to an Excellent Future at the University of California, Riverside, 2023.
- Attended a conference on Strengthening Community in Research Mathematics at Pomona College, Claremont CA, 2023.
- Mathematical Association of America Southern California and Nevada Sectional meetings, 2023 (2), 2022, 2021 (2).
- Thematic Program in Commutative Algebra and its Interaction with Algebraic Geometry, Notre Dame, May-Jun, 2019
- Morgantown Algebra Days 2019, West Virginia University, Apr 2019.
- Southwest Local Algebra Meeting, Feb, 2019, Feb 2018, Mar 2017, Feb 2016, Feb 2015, Mar 2011.
- AMS Sectional Meetings, Nov 2018, Oct 2018, Apr 2016 (2), Oct 2015 (2), Mar 2015, Apr 2014, Nov 2013, Oct 2013, Oct 2012, Apr 2012, Nov 2010, Mar 2010, Oct 2007.
- Symposium in Algebraic Geometry, Busan, Korea, Dec 2017.
- Kumunu 2017, University of Kansas, Oct 2017.
- A View Toward Algebraic Geometry; a conference in honor of David Eisenbud's 70th birthday, May 2017.
- RTG Workshop on the Homological Conjectures in Commutative Algebra, University of Illinois at Chicago, Nov 2016.
- Commutative Algebra and its Interactions with Algebraic Geometry: Tight Closure, Linkage, and Syzygies, University of Michigan, Jul 2016.
- Local & global method in algebraic geometry, a conference honoring Lawrence Ein's 60th birthday, University of Illinois at Chicago, May 2016.
- Midwest Commutative Algebra and Algebraic Geometry Conference, University of Notre Dame, May 2016.
- Midwest Commutative Algebra Conference, Purdue University, May 2015.
- Positive Characteristic Algebraic Geometry Workshop, University of Illinois at Chicago, Mar 2014.
- Introductory Workshop: Noncommutative Algebraic Geometry and Representation Theory, MSRI, Jan 2013.
- Recent Advances in Algebraic Geometry, a conference in honor of Rob Lazarsfeld's 60th birthday, Ann Arbor, Michigan, May 2013.
- The Commutative Algebra of Singularities in Birational Geometry: Multiplier Ideals, Jets, Valuations, and Positive Characteristic Methods, MSRI, May 2013.
- Representation Theory, Homological Algebra, and Free Resolutions, MSRI, Feb 2013.
- Joint Introductory Workshop on Cluster Algebras and Commutative Algebra, MSRI, Aug 2012.

- 2nd and 3rd Bluegrass Algebra Conference, University of Kentucky, Mar 2009, Jun 2012.
- Computational workshop on F-singularities, University of Michigan, May 2012.
- Interactions between Commutative Algebra and Representation Theory, Apr 2012.
- Algebra, Geometry and Combinatorics Day, University of Illinois at Urbana-Champaign, Purdue University, Indiana University Purdue University Indianapolis, Nov 2009, May, Oct 2010, Mar, Oct 2011, Apr 2012.
- Commutative Algebra and Algebraic Geometry Conference, University of Illinois at Urbana-Champaign, Nov 2011.
- Midwest Commutative Algebra and Geometry Conference, Purdue University, May 2011.
- School and Workshop on Local Rings and Local Study of Algebraic Varieties, Trieste, Italy, Jun 2010.
- Mathematics Research Community on Commutative Algebra, Snowbird, Utah, Jun 2010.
- PASI in Commutative Algebra and Its Connections to Geometry, Honoring Wolmer Vasconcelos, Olinda, Brazil, Mar 2009.
- Conference to Celebrate Robin Hartshorne's 70th Birthday, University of Illinois at Chicago, Apr 2008.
- Commutative Algebra and Its Interactions: A Conference in Honor of Mel Hochster, University of Michigan, Jul 2008.

## Teaching Experiences<sup>3</sup>

### California State University San Bernardino

All, but 6000 level, classes are around 25-30 students. 6000 level courses are around 5-15 students, course catalogue.<sup>4</sup>

Math 2265 Statistics with Applications	F2024
Math 2372 Discrete Mathematics	F2024
Math 1201 Introduction to Statistical Thinking	Su2024
Math 2270 Differential Equations with Dynamical Systems I	S2024
Math 4270 Differential Equations with Dynamical Systems II	S2024
MATH 6110 Topics in Mathematics; Introduction to Toric Varieties	S2023
MATH 5510 Topics in Advanced Mathematics; Bridge to PhD Program	F2022
MATH 6000 Communicating Mathematics	F2022
MATH 6016 Graduate Algebra	S2022
MATH 2220 Calculus II (two sections)	F2021
MATH 5550 Introduction to Topology	F2021
MATH 2210 Calculus I Lab	S2021
MATH 4600 Theory of Rings and Fields	S2021
MATH 6016 Graduate Algebra	S2021
MATH 2210 Calculus I	F2020
MATH 2210 Calculus I Lab	F2020
MATH 4600 Theory of Rings and Fields	F2020

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<sup>3</sup>S = Spring, Su = Summer, F = Fall, W = Winter

<sup>4</sup><https://catalog.csusb.edu/coursesaz/math/>

## University of Arkansas, Fayetteville

All classes are between 55 to 70 students.

MATH2564 Calculus II (two sections)	F2019
MATH2584C Elementary Differential Equations (two sections)	S2018, S2019, F2018
MATH2043 Survey of Calculus (two sections)	F2017

## University of California, Riverside

All classes were large lectures, between 80 to 230 students, with a number of teaching assistants.

MATH 9C First Year Calculus III (two sections)	S2017
MATH 6B Introduction to College Math for Science (Pre-calculus)	W2017
MATH 9C First Year Calculus III	F2016
MATH 120 Optimization Techniques	F2016
MATH 9C First Year Calculus III	S2016
MATH 120 Optimization Techniques	S2016
MATH 022 Calculus for Business	W2016
MATH 031 Applied Linear Algebra	W2016
MATH 9C First Year Calculus III (two sections)	F2015
MATH 9B First Year Calculus II	S2015
MATH 131 Linear Algebra (proof based course)	S2015
MATH 9A First Year Calculus (two sections)	W2015
MATH 8B Introduction to College Mathematics for Science	F2014
MATH 10A Calculus of Several Variables I	F2014

## Purdue University

MA266, Ordinary Differential Equations	Instructor	Su2013
MA22400, Introductory Analysis II (Business Calculus)	Instructor	F2011, S2012
MA15300, Algebra and Trigonometry I (College Algebra)	Instructor	F2007, F2008, S2010
MA162, Plane Analytic Geometry and Calculus II	Instructor	Su2008
MA59800, Algebra Qualifying Exam Problem Session	Instructor	Su2011, Su2012
MA59800, Abstract Algebra (Graduate Algebra Course)	Recitation instructor	F2012, F2013
MA16200, Plane Analytic Geometry And Calculus II	Recitation instructor	S2009
MA166, Analytic Geometry And Calculus II	Recitation instructor	S2008
MA161, Plane Analytic Geometry And Calculus I	Recitation instructor	S2007
MA261, Multivariate Calculus	Recitation instructor	F2006

## Teaching Conferences and Workshops

- Introduction to Teaching Online using Quality Learning and Teaching, certificate, Summer 2020, California State University San Bernardino.
- AMS Assessment in Mathematics, Jun 2020, online, Zoom.
- Mastery Grading Conference, Jun 2020, online, Zoom.